

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 23501

CSAH NO. 5

OVER THE

ROOT RIVER

DISTRICT 6 - FILLMORE COUNTY



PREPARED FOR THE
MINNESOTA DEPARTMENT OF TRANSPORTATION

BY
COLLINS ENGINEERS, INC.

JOB NO. 3512 (CEI 143)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 23501, Piers 1 and 2, were found to be in good to satisfactory condition. A heavy accumulation of timber debris was observed at the upstream ends and along the sides of both piers. The timber drift made Pier 1 inaccessible to the diver; however, soundings indicated footing exposure and potentially up to 6 inches of undermining. Pier 2 exhibited up to 4 feet of undermining and steel H-pile exposure. Due to the heavy accumulations of debris around the piers, the channel bottom has degraded up to 6 feet since the previous inspection

INSPECTION FINDINGS:

- (A) A heavy accumulation of 1-foot-diameter and smaller timber debris was observed extending from the channel bottom to the top of the pier cap at the upstream end and along both faces of Pier 1. Soundings indicate the footing was exposed at Pier 1 at the upstream nose, along the west face, and at the downstream nose with 6 inches of undermining along the west face, however, the area was inaccessible to the diver and footing exposure or undermining could not be confirmed.
- (B) A moderate accumulation of 2-foot-diameter-and-smaller timber debris was observed extending from the channel bottom to the top of the pier cap at the upstream end and along both faces of Pier 2.
- (C) The footing was exposed at Pier 2 with undermining and exposed steel H-piles observed from the midpoint along the east face, around the upstream end, and extending to the downstream end with a maximum height of 4 feet at the upstream nose.

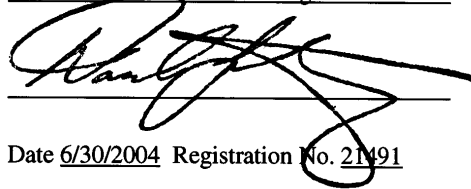
- (D) Two vertical hairline cracks were observed at the midpoint of Pier 2 that extended from the top of the pier cap to 2 feet below the waterline on the east face and to the channel bottom on the west face.

RECOMMENDATIONS:

- (A) Remove the heavy accumulations of timber debris around Piers 1 and 2 to alleviate further degradation of the channel bottom and undermining of the piers.
- (B) Scour rating indicates that bridge has the potential to be at greater risk for scour with further scour analysis required. At a minimum, it is recommended that riprap be properly designed and placed around the piers and in the scour/undermining areas to armor against further scour, unless further scour analysis indicated differently.
- (C) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

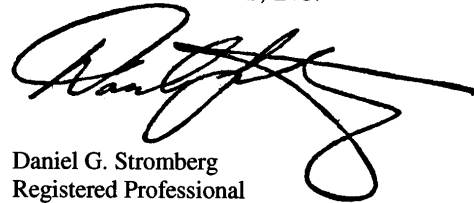
Daniel G. Stromberg



Date 6/30/2004 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.



Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 23501

Feature Crossed: The Root River

Feature Carried: CSAH No. 5

Location: District 6 - Fillmore County

Bridge Description: The superstructure consists of three spans of continuous multiple steel stringers supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete abutments and two reinforced concrete piers. Both the abutments and piers are supported by steel H-piles. The piers are numbered 1 and 2 starting from the south end of the bridge.

2. INSPECTION DATA

Professional Engineer/Team Leader: Shirley M. Walker, P.E.

Dive Team: Michelle D. Koerbel, Clayton G. Brookins

Date: October 3, 2002

Weather Conditions: Light Rain, " 45EF

Underwater Visibility: " 2 Feet

Waterway Velocity: Negligible/None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2.

General Shape: The piers consist of a rectangular concrete shaft with rounded ends that supports a hammerhead pier cap and bears on a rectangular concrete footing founded on steel H-piles.

Maximum Water Depth at Substructure Inspected: Approximately 11 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap on the west end of Pier 2.

Water Surface: The waterline was approximately 10.2 feet below reference.
Waterline Elevation = 992.7.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 7

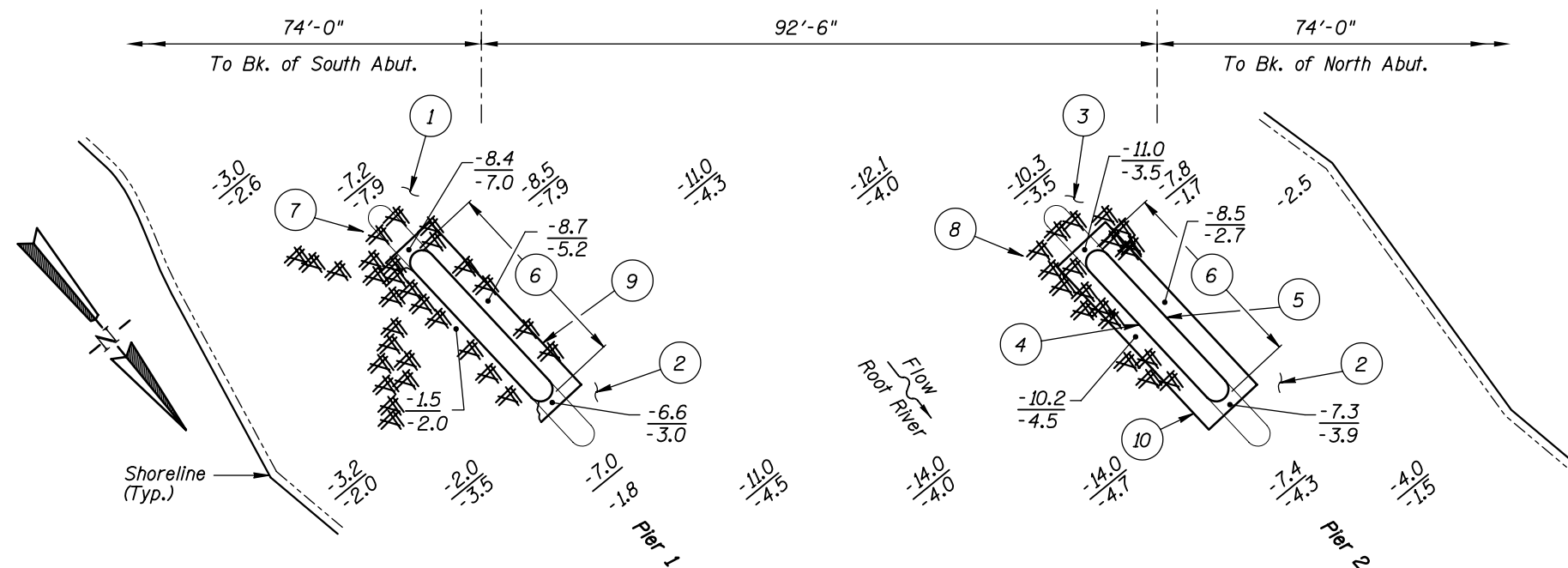
Item 61: Channel and Channel Protection: Code 5

Item 92B: Underwater Inspection: Code B/10/02

Item 113: Scour Critical Bridges: Code J/92

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

_____ Yes X No



SOUNDING PLAN

GENERAL NOTES:

1. Piers 1 and 2 were inspected underwater.
2. At the time of inspection on October 3, 2002, the waterline was located approximately 10.2 feet below the top of the pier cap at the west face of Pier 2. This corresponds to a waterline elevation of 992.7 based on the previous report dated September 29, 1997.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

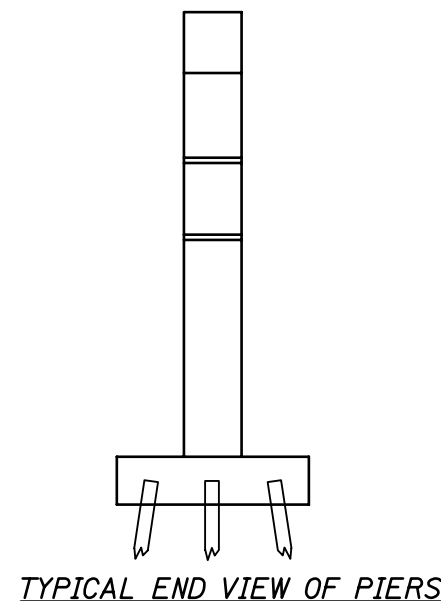
INSPECTION NOTES:

- 1 The channel bottom consisted of gravel and silt with 2 inches of probe rod penetration.
- 2 The channel bottom consisted of silty sand with up to 1 foot of probe rod penetration.
- 3 The channel bottom consisted of soft silt with up to 3 feet of probe rod penetration.
- 4 A vertical hairline crack was observed at the midpoint of Pier 2 that extended from the top of the pier cap to 2 feet below the waterline.
- 5 A vertical hairline crack was observed at the midpoint of Pier 2 that extended from the top of the pier cap to the top of the footing.
- 6 Light scaling was observed along all pier faces from 1 foot above to 1 foot below the waterline with a maximum penetration of 1/16 inch.
- 7 A heavy accumulation of 1-foot-diameter-and-smaller timber debris was observed extending from the channel bottom to the top of the pier cap at the upstream end and along both faces of Pier 1.
- 8 A moderate to heavy accumulation of 2-foot-diameter-and-smaller timber debris was observed extending from the channel bottom to the top of the pier cap at the upstream end and along both faces of Pier 2.
- 9 Soundings indicate the footing was exposed at Pier 1 at the upstream nose, along the west face, and at the downstream nose with 6 inches of potential undermining along the west face (area inaccessible to diver due to heavy debris).
- 10 The footing was exposed at Pier 2 with undermining and steel H-piles observed from the midpoint along the east face, around the upstream end, and extending to the downstream end with a maximum height of 4 feet at the upstream nose.

Legend

- 2.0 Sounding Depth from Waterline (10/3/02)
-5.2 Sounding Depth from Waterline (9/29/97)

Timber Debris

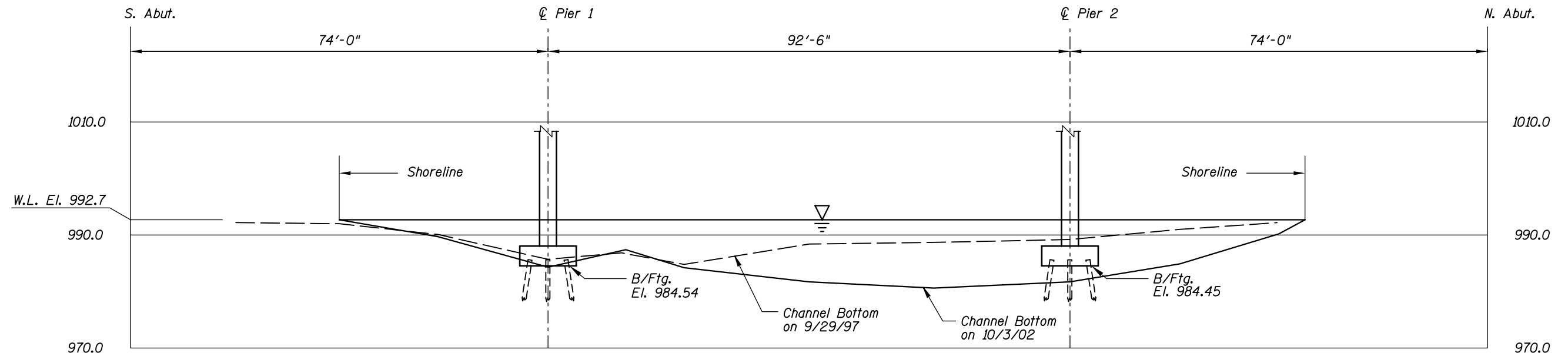


**MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION**

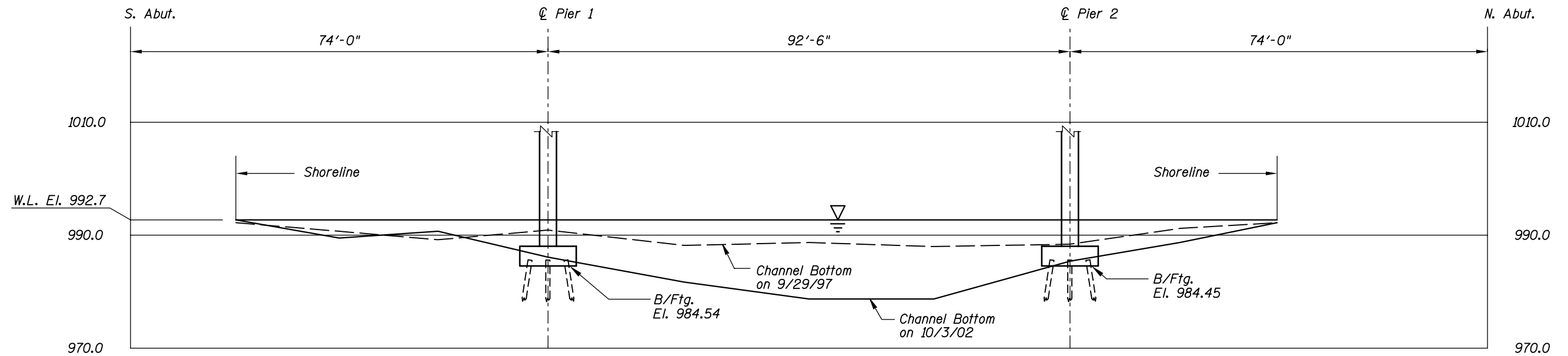
STRUCTURE NO. 23501
OVER THE ROOT RIVER
DISTRICT 6, FILLMORE COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: PRH	COLLINS ENGINEERS, INC.	Date: OCT. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: NTS
Code: 35I20I43		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION			
STRUCTURE NO. 23501 OVER THE ROOT RIVER DISTRICT 6, FILLMORE COUNTY			
UPSTREAM AND DOWNSTREAM FASCIA PROFILES			
Drawn By: PRH	 COLLINS ENGINEERS, INC. 300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Date: OCT. 2002	
Checked By: MDK		Scale: 1"=20'	
Code: 35I20I43		Figure No.: 2	



Photograph 1. Overall View of the Structure, Looking Southwest.



Photograph 2. View of Pier 1, Looking Southwest.



Photograph 3. View of Pier 2, Looking Southwest.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: October 3, 2002
ON-SITE TEAM LEADER: Shirley M. Walker, P.E.
BRIDGE NO: 23501 WEATHER: Light Rain, " 45EF
WATERWAY CROSSED: The Root River
DIVING OPERATION: X SCUBA SURFACE SUPPLIED AIR
OTHER
PERSONNEL: Michelle D. Koerbel, Clayton G. Brookins
EQUIPMENT: Scuba, Scraper, Sounding Pole, Lead Line, Probe Rod, Camera
TIME IN WATER: 9:35 a.m.
TIME OUT OF WATER: 10:30 a.m.
WATERWAY DATA: VELOCITY Negligible/None
VISIBILITY " 2 feet
DEPTH 11 feet maximum at Pier 2.
ELEMENTS INSPECTED: Piers 1 and 2

REMARKS: A heavy accumulation of large trees and timber debris made the majority of the perimeter of Pier 1 inaccessible to the diver. Sounding depths indicated possible footing exposure and undermining at Pier 1. A moderate to heavy accumulation of timber debris, including a 24 inch diameter logs, was observed at Pier 2. The footing at Pier 2 was exposed with undermining and steel H-pile exposure from the midpoint at the west face, around the upstream nose, and extending to the downstream nose with a maximum height of 4 feet. The concrete surfaces of the piers were in good condition with light scaling observed near the waterline. The channel bottom has degraded by 6 feet since the previous inspection possibly due to the heavy accumulation of debris around the piers.

FURTHER ACTION NEEDED: X YES NO

Remove the heavy accumulations of timber debris around Piers 1 and 2 to alleviate further degradation of the channel bottom and undermining of the piers.

FURTHER ACTION NEEDED (CONTINUED)

Scour rating indicates that bridge has the potential to be at greater risk for scour with further scour analysis required. At a minimum, it is recommended that riprap be properly designed and placed around the piers and in the scour/undermining areas to armor against further scour, unless further scour analysis indicated differently.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 23501
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Shirley M. Walker, P.E.
WATERWAY CROSSED The Root River

INSPECTION DATE October 3, 2002
NOTE: USE ALL APPLICABLE CONDITION
DEFINITIONS AS DEFINED IN THE MINNESOTA
RECORDING AND CODING GUIDE INCLUDING
GENERAL, SUBSTRUCTURE, CHANNEL AND
PROTECTION, AND CULVERTS AND WALL
DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

UNIT REFERENCE NO.	UNIT DESCRIPTION	MAXIMUM DEPTH OF WATER	SUBSTRUCTURE						CHANNEL					GENERAL					
			PIILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 1	8.7'	N	7	7	9	N	7	5	N	N	4	4	7	N	N	N	N	N
	Pier 2	11.0'	N	7	7	9	N	7	5	N	N	5	5	7	N	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: A heavy accumulation of large trees and timber debris made the majority of the perimeter of Pier 1 inaccessible to the diver. Sounding depths indicated possible footing exposure and undermining at Pier 1. A moderate to heavy accumulation of timber debris, including a 24 inch diameter logs, was observed at Pier 2. The footing at Pier 2 was exposed with undermining and steel H-pile exposure from the midpoint at the west face, around the upstream nose, and extending to the downstream nose with a maximum height of 4 feet. The concrete surfaces of the piers were in good condition with light scaling observed near the waterline. The channel bottom has degraded by 6 feet since the previous inspection possibly due to the heavy accumulation of debris around the piers.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.